UNDERSTANDING USER EXPERIENCE THROUGH SENSEMAKING PROCESSES

Galo Carrion Andrade

Submitted to the faculty of Herron School of Art and Design
in partial fulfillment of the requirements for the degree
Master of Fine Arts in Visual Communication Design
Herron School of Art and Design
Indiana University

May, 2016

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Accepted: May, 2016

Professor Valerie Eickmeier
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ABSTRACT

This research explores users' experiences, a significant component of service design, which in recent years has gained value within the business and public sectors. Today, we cannot even imagine some products without their service component, and, because of that, brands are increasingly concerned with understanding user experience.

Using public transportation in Indianapolis as the context to examine the sensemaking process, this research intends to develop a procedure to understand user experiences in service design, which can be applied to other problem spaces.

This research has been organized into four parts; the first one, Initial Explorations, discusses the motivations that have led me to choose this specific topic, its importance, the role of user experience as the cornerstone of service design, and concludes with a justification of the use of public transportation as the study context.

The second part illustrates the research conducted in public transportation as the context to use different methods and tools for understanding user/commuter experience; in first place, collecting data that will be analyzed and later synthesized using a sensemaking process.

The third chapter identifies key points of the procedure looking for ways to improve the application of methods and tools to develop a procedure that could be applied in other contexts.

Finally, chapter four concludes with some thoughts and recommendations about the role and importance of the sensemaking process in service design.

Still from *Back to the future*, Copyright 1985,
Universal Pictures and Amblin Entertainment

The future is the design space. The past is closed for acts of design. Design is only possible in a mood of hope. There is not Design where there is resignation, a depressive attitude without confidence in the future.

Gui Bonsiepe

CHAPTER 1

INITIAL EXPLORATIONS

Research question revisited

My interest in design thinking (the verb, not the "buzz word" noun) as the visual reasoning process that comes from reflection about the practice of design and how can this be applied to other disciplines shaped the early beginnings of this research, placing emphasis, firstly, on the process to develop sensemaking maps to understand the user experience in public transportation in Indianapolis, and, secondly, on the use of smartphones to collect data. This latter component of my initial question was introduced because design research is normally associated with face-to-face interactions, but from my perspective, it is interesting how mobile devices are an important part of our lives today, influencing how we communicate, how we perform regular activities, and how we express and share our feelings.

In this scenario, my initial research question was developed as follows:

> How might mobile devices inform sensemaking maps to understand the travel experience of frequent users of public transportation in Indianapolis?

Subsequent recommendations from my thesis committee, and a better understanding of the sensemaking process as an activity beyond maps as visual outcomes, shifted the perspective of my research to the sensemaking process to understand user experience. The revisited research question was restated as follows:

> **How might sensemaking processes enable researchers and policy makers to understand users' experiences in service design?**

Sub-questions

1. What methods and tools could be used to understand experiences in service design?
2. How can sensemaking process enable the understanding of experiences?

Justification

The interface is the central domain, on which the designer focuses its attention. Through the design of the interface, he articulates the space of action for the user."

Las 7 columnas del diseño. Gui Bonsiepe

From Design to Service Design

The design process, regardless of the nature of the final outcome, is what authors have described as abductive reasoning, a process "related to insight and creative problem solving" (Kolko, 2010). In the quest for an appropriate solution, designers develop several strategies, processes, and tools. A "design thinking" process, focused on problem-solving, can be translated to other disciplines (Kimbell, 2014) because it is "well adapted to handle unique and ill-defined problems" (Palafox, 2010), and because of its inherently iterative nature. Designers work "through a series of thinking-actions of moving-seeing-moving" (Cross, 2011) proposing tools to facilitate actions, and, for example, a design thinking approach can be translated to reframing a problem, prototyping solutions, creating artifacts to trigger conversations, or building empathy with participants, among others.

In this new scenario, design is acting in different and complex domains, working as part of interdisciplinary teams, collaborating and developing solutions in fields like healthcare, policy making or business. Service design is one of these disciplines that use this design approach in service creation.

> "Service design replicates those parts of other design disciplines that go before the product: the user-centeredness, the sense of innovation, and the challenge to make things better, simpler, and more connected to the values and needs of the user" (Heapy, 2011).

Also, Service design is important as part of the economy. By 2010, the service sector represented 84% of the U.S. economy (Haksever, 2013), and, in most countries of the EU, services constitute between 60 and 75% of the GDP (Whicher et al., 2013). Additionally, in the last decade, we have experienced big changes in how manufacturers and consumers are conceiving and interacting with products. Internet and other technological developments have played a crucial role in this change; a few years ago, buying a turntable, and buying records were looked upon as different activities. Today, we can not think of an MP3 player without associating it with the experience of how we know about an artist, or how we acquire and share music on social networks. All of these activities are fully connected now.

In "An Overview of Service Design for the Private and Public Sectors," authors also claim that economy is moving from product to service-oriented. Needs that formerly were met by products are satisfied now by services "as a contemporary consumer expects a continuous relationship with the product and brand, even beyond the point of sale" (Whicher et al., 2013).

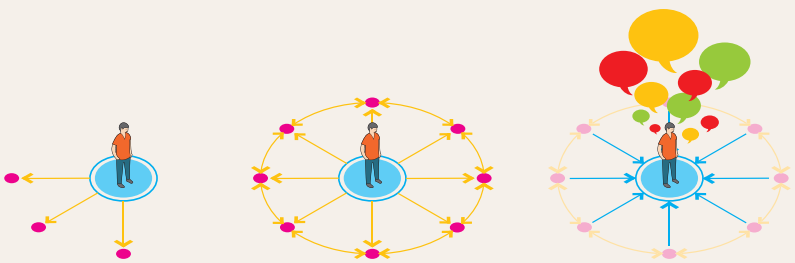
A list of trends, provided in the same article, makes evident this change in the global economy:

1. The development of service platforms such as iTunes, the AppStore, Amazon and Netflix, which eliminate the need for physical products;
2. Services that redefine the issue of ownership (car sharing, city bike schemes);
3. Service-enhanced products (smartphones and tablets);
4. Services in which the user becomes the designer of the product (NIKEiD, Young Users by VOX Furniture).

In this context, providing a good service is important in both public and private sectors. Think again about the iPod for example: the experience of using a MP3 player is not just related to the product and its affordances, but, in this case (as mentioned before), connected to all the user's interactions of buying, listening, and sharing music, news, podcasts or apps that are distributed through the iTunes platform. An iPod is useless without its service component, and for Apple this represents a considerable business share. Now, think about the last time that you went to the hospital. Getting sick is always a problem because it is not just about illness but also about getting an appointment, travelling, buying medicines, and getting some rest at home. Illness affects our daily life and health providers today are trying to lower its impact by providing transportation or home delivery pharmacy services.

To deliver appropriate services, Apple or Healthcare providers, focus their efforts on understanding the experience of customers/users to satisfy their needs, creating "a system of thoughtfully executed customer interactions" (Bedford, 2008).

Then, understanding the value and the nature of these relations between users and people, places, artifacts during time and space is crucial to designing services.



Considering that a service is "[a]n interrelated system of people, practices, values, and technologies within a particular local environment" (Nardi and O'Day, 2000), service design researchers look for the emotions and feelings resulting from these multiple interactions to create appropriate service solutions.

Despite knowing the importance of user experience in service design, and the vast literature about design processes, methods and tools, there is not a specific procedure that enables understanding the user experience using a sensemaking approach. This research attempts to provide a procedure that can work as a baseline to be adapted to other contexts, using interviews, social media network analysis, and on-line surveys to collect data, a sensemaking process to analyze and synthesize it, and guidelines to develop experience maps.

Public Transportation as the platform to research a procedure to understand user experiences

Public transportation service plays an important role in connecting people with other people, places and entities, and giving them access and creating opportunities to improve their life conditions. According to the Cities of Opportunity[1] report, Public Transportation (PT) is part of this complex network of individuals, groups, entities, infrastructure, and policies that make a city attractive.

The relevance of public transportation service also lies in the socioeconomic characteristics of its users. Around the United States, the vast majority of PT commuters are minorities and people living below the poverty line. In Indianapolis, specifically, 20% of PT commuters are living in poverty, and black, and latino users represent around 65 %[2].

In the recent years, PT has also been among the main concerns of urban planning. The Indianapolis Bicentennial Plan for 2020, for example, is developed around five main themes, including PT as a tool to "create a community where people have access to places and information, facilitate the free flow and the exchange of information, and catalyzes economic growth"[3]. The PT component, known as Connect Indy, is strongly based on Transit Oriented Development.

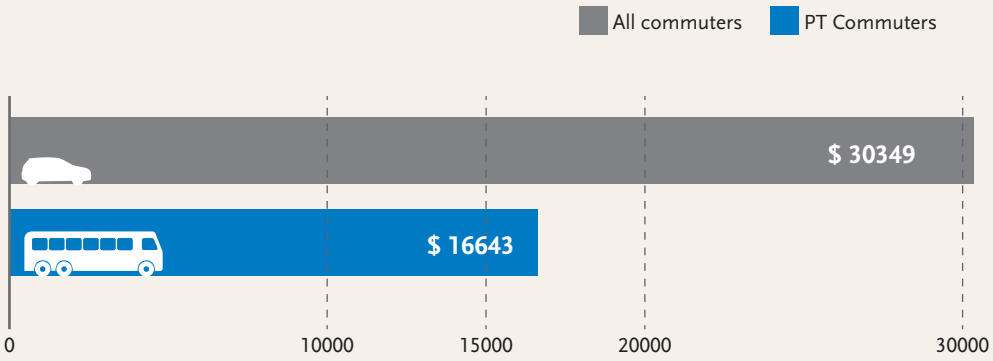
In this context, People-Centered Design Research is critical to understand the experiences of PT commuters and improve their quality of life because design processes and methodologies have demonstrated better handling of ill-defined problem spaces and complexity (Palafox 2010). People-centered research is an approach that looks, in this case, to users as an opportunity to learn more about the problem and validate their knowledge. This approach differs from the traditional quantitative approach of research because solutions proposed from the "human-centered design perspective aim to solve the needs of real people—not manufactured personas" (Seeman 2012). To collect qualitative data, design researchers normally use "face-to-face" methods such as Contextual Inquiries, Interviews, Fly-on-the-Wall Observations (among others), but they tend not to rely too much on the use of technology because there are assumptions frequently made about the validity of intermediate contact and the quality of the data collected when using other methods that do not include human.

1 Cities of Opportunity is a study of 27 cities recognized as leading centers around the world in business, culture, infrastructure or services, this report examines the relationship among several dimensions to uncover what makes a city a better place to live and thrive in as human being.

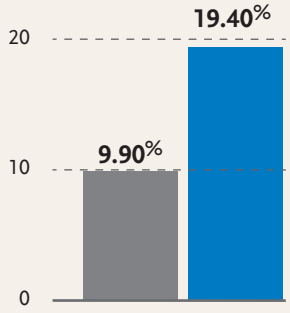
2 The on-line article "Public Transportation's Demographic Divide" reveals that in almost every city across U.S. there is a big gap between public transportation users and other commuters. The study also reports that with the exception of New York, Chicago, Oakland, California, and Jersey City, which show similar median incomes of public transportation user and other commuters, this socioeconomic gap has persisted for decades around the U.S.

3 http://plan2020.com/committees/connect/

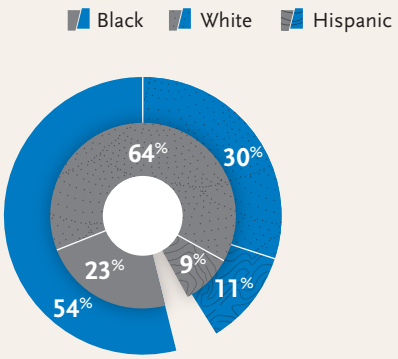
Commuters' Median Earnings / Graph 1



Percentage of Commuters living in poverty / Graph 2



Race and Ethnicity Demographics of PT / Graph 3



Graph 1-3: Besides poverty, bus riders are more likely part of minority groups than those who use their own cars. In Indianapolis, for example, the median income for an average user of public transportation is half that of those driving to work. *Source: American Community Survey, 2010-2012 estimates.*

Using smartphones for data collection

The technological advances of the last few years, especially the appearance and extended use of tablets, smartphones, and other devices oblige us to review how we understand our relationships with technology. By 2015, mobile devices are extensively used in the U.S., with around two-thirds of adults owning a smartphone. Their use is higher in young Americans and people with relatively high incomes, but households with incomes lower than 30,000 USD per year are more dependent on them for on-line access—looking for jobs and accessing news for example[4]. This ubiquitous nature makes smartphones a perfect tool to explore the advantages of collecting meaningful information within a specific context—in this case while users are using the public transportation system—instead of taking the users out of the problem context to conduct focus groups or another kinds of sessions. Additionally, the massive use of social networks and other applications that use non-standard orthographies[5] or paralinguistic communication. Using emoticons or emojis instead of traditional text makes smartphones a potentially useful tool to collect qualitative data. Recent

4 For more detailed information about the use of smartphone in U.S. consult http://www.pewinternet.org/files/2015/03/PI_Smartphones_0401151.pdf.

5 In non-verbal communication as text messaging people have found better ways to communicate their emotions using alternative orthographies as Emoticons :(or :-) or Emojis.

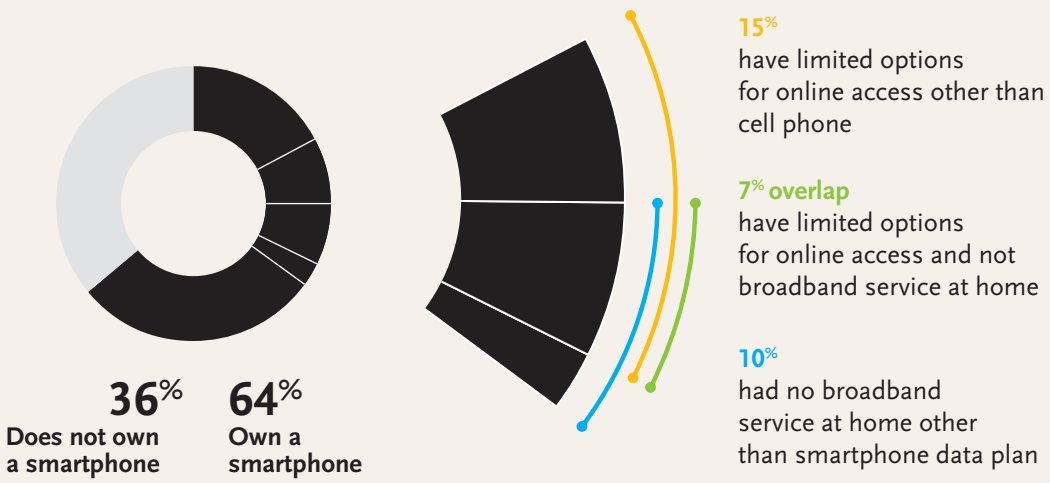
studies have shown that emoji, for example, are not only a representation of faces but also concepts, ideas, and activities, and play other roles such as showing author intention, socio-cultural differences, and author identity (Derk, Bos, and Vo Grumbkow 2007; Schnoebelen 2012; Park et al. 2013).

Today, smartphones have an enormous number of capabilities —cameras, microphones, gyroscopes, GPS, among others sensors— that allowed many studies use them as research tool and specifically to conduct what is defined as "Participatory Sensing" (Kanhere 2013), and today, thanks to the high connectivity it is also possible to share the data collected using the different networks available across cities. Some of the most well-known studies include monitoring traffic conditions, activity or movement tracking/recognition, monitoring health information, and analysis of enriched social network information.

Despite the potential of smartphones as a tool for collecting data, the final purpose of this study is not just to collect qualitative data but to make sense of it and to propose a tool to help understand the user experience of commuters. This research will use sensemaking maps as a process and as a tool to synthesize the data, understanding "synthesis [as] an abductive sensemaking process," which [t]hrough efforts of data manipulation, organization, pruning, and filtering, designers produce information and knowledge" (Kolko 2010).

The main goal of "*participatory sensing* is to empower ordinary people to collect and shared data from their surrounding environments using their mobile phones" (Kanhere 2013)

The smartphone population / Graph 4



Graph 4: The massive use of mobile phones and its importance in the daily life of common citizens make them a tool with a big potential to collect and share data. *Source: Pew Research Center, April, 2015, "The Smartphone Difference"*

Sensemaking, in Design Research, is a process of uncovering the underlying meaning of collected data by externalizing the visual thinking process, its primary goal is to find patterns, relationships, and uncover hidden information from a specific phenomenon.

The outcome of this research is a procedure, which presents the key concepts from the commuters' experience and could be used as a tool to articulate an appropriate solution to improve the quality of their travel experience.

Research scope

The scope of this project is to use public transportation in Indianapolis as a platform to explore a sensemaking process to understand user experience.

As part of this research mobile devices will be utilized as tools to collect different types of data, but due to the time frame and for the purposes of this research, the development, usability, or design of these tools will not be considered a central concern from the people-centered design perspective, even when the goal of developing these tools/apps might achieve the best possible results. It is impossible for a research project of this nature to cover app development without exceeding its scale and scope.

Due to the time frame available to develop the research, this study will be limited to the travel experience of frequent users only during the winter season—December through March—despite the understanding that collecting more information throughout a whole year could give more legitimacy to the research findings and improve applicability in other contexts.

Still from *Being John Malkovich*, Copyright 1999,
Propaganda Films & Single Cell Pictures

To value your customer, you need to spend some time understanding the interactions they have with your service, and that means two things. First, viewing your service through the customers' eyes. And second, designing in such a way that customers receive consistent experiences over time that they consider valuable.

Simon Clatworthy

CHAPTER 2

UNDERSTANDING USERS OF PUBLIC TRANSPORTATION

[redacted] Follow

@IndyGoBus this how I got fired from my last job cuz the bus was late guess what the employer doesn't give a FCk either, I'm late again

5:37 AM - 7 Mar 2016

[redacted] Follow

@IndyGoBus Bus Operator #8272 was fantastic this morning, very friendly!

RETWEET 1 LIKES 3

6:15 AM - 9 Mar 2016

[redacted] Follow

If @IndyGoBus wants to be seen as a serious alternative to car culture, they need to make basic steps to be seen as a viable alternative

8:12 PM - 17 Feb 2016

Indianapolis, IN

[redacted] Follow

@IndyGoBus can't wait until my bus starts running on Sunday! 😍😍

LIKE 1

12:47 PM - 28 Feb 2016

[redacted] Follow

Just saw a @IndyGoBus blow a redlight in front of a @IMPD_News officer who did nothing. This is how accidents happen. @IndyMayorJoe

11:43 AM - 8 Mar 2016

[redacted] Follow

@IndyMayorJoe @AndreaWTHR @IndyDPW @WTHRcom At 415pm, downtown hadn't been touched & an @IndyGoBus almost slid into a bus shelter!

7:50 PM - 14 Feb 2016

[redacted] Follow

Apparently someone can't wait to build their blunt in private @IndyGoBus :(

LIKE 1

9:21 AM - 23 Feb 2016

[redacted] Follow

@IndyGoBus in this weather someone could have frostbite in 15 minutes!

8:57 AM - 10 Feb 2016

[redacted] Follow

@IndyGoBus giveth and they taketh away 😩😫 that was my stop!

[redacted] Follow

@IndyGoBus Someone needs to check the cameras on coach #9905, with driver #8191! We need seatbelts to stay in our seats!

8:32 AM - 17 Feb 2016

[redacted] Follow

@IndyGoBus best driver ever...BO#8611 very pleasant... OB31

7:15 AM - 19 Feb 2016

[redacted] Follow

Ugh! 2 days in a row, IB25 due in Speedway Ctr more than 8 mins late for no reason @IndyGoBus #NOTACCEPTABLE!!!!

6:51 AM - 25 Feb 2016

[redacted] Follow

@IndyGoBus So finally rode an electric bus today. I like them, but @seanspellman701 was right, the stop announcements don't work on them.

9:13 AM - 23 Feb 2016

[redacted] Follow

@Lantern68 @IndianapolisCP HaHa Where are #CarmelIn #FishersIn gonna run to when #Indy @IndyGoBus Style #RedLine Diversity comes Downtown??

7:46 AM - 23 Feb 2016

[redacted] Follow

@cirta_us @IndyGoBus is their and bus routes that connect Southeast Indianapolis to Shelbyville?

8:45 AM - 14 Feb 2016

[redacted] Follow

Huh. I can't take @IndyGoBus to get to @ButlerU. That's surprising.

9:31 AM - 2 Mar 2016

The research was organized into two different parts: 1. First, data was collected by interviews, twitter posts, and on-line surveys. 2. Then, the data was analyzed to reveal patterns or recurrent themes, and then synthesized into sensemaking maps that present a comprehensive landscape of the commuters' experiences.

Data collection

Twitter content

Originally, the data collection was planned in three instances to obtain several outcomes, and a final sensemaking map using the entirety of information gathered during the study. Despite the initial plan, the research started with collecting Twitter posts with the hashtags (#) *indygo*, and *indygobus*. Also, posts produced by users and directly related to the service were collected, while posts using the same hashtags but which contained content about news, links or promoting the service were disregarded.

Interviews

A second stage of data collection included interviewing users of public transportation in Indianapolis; the criteria for recruitment was that commuters needed to use PT at least four times per week, and that they worked in the downtown Indianapolis area.

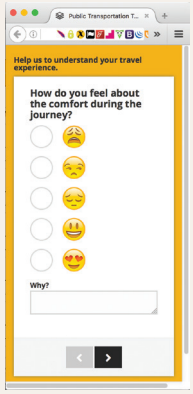
A total of five persons were interviewed, four females and one male. Questions were developed as a guide to lead the interview and based on the variables posited by Olio and Cecín in "Modelling user perception of bus transit quality" (2010): Waiting time (WT), journey time (JT), access time walking to the initial bus stop (AT), safety within the vehicle (SV), comfort during starting and stopping (CDSS), comfort during the journey (CDT), cleanliness of the vehicle (CV), price of the bus ticket (PT), quality of the vehicle (QV), reliability of the vehicle (RS) and the kindness of the bus driver (KBD).

Questions were developed to understand the actions and interactions of users at different service touchpoints, but also before and after travelling, while they were planning and deciding which bus route and which schedule was more convenient for them. In addition, interviews were conducted, with the help of an iPad, both to generate empathy in interviews using a drawing application, and as a strategy to collect quantitative information.

On-line surveys

The main goal of on-line surveys was to use smartphones to collect enriched data—info that could containt other information (such as location or time of day) based on the device's built-in sensors—due to multiple difficulties, and after trying different options such as using QR codes, mobile apps such as IFTT (If this then that) and ODK—Open Data Kit—an open source app that allows the collection of multimedia information, it was decided to use an on-line survey hosted at www.indymood.com and codified to relate the answers to specific locations.

The on-line survey consists of 11 closed questions using the same variables from interviews, and one open question; every user accessing the survey by phone was able to answer one question (randomly selected from the question bank). Participant's answers were sent by email to the researcher using PHP.

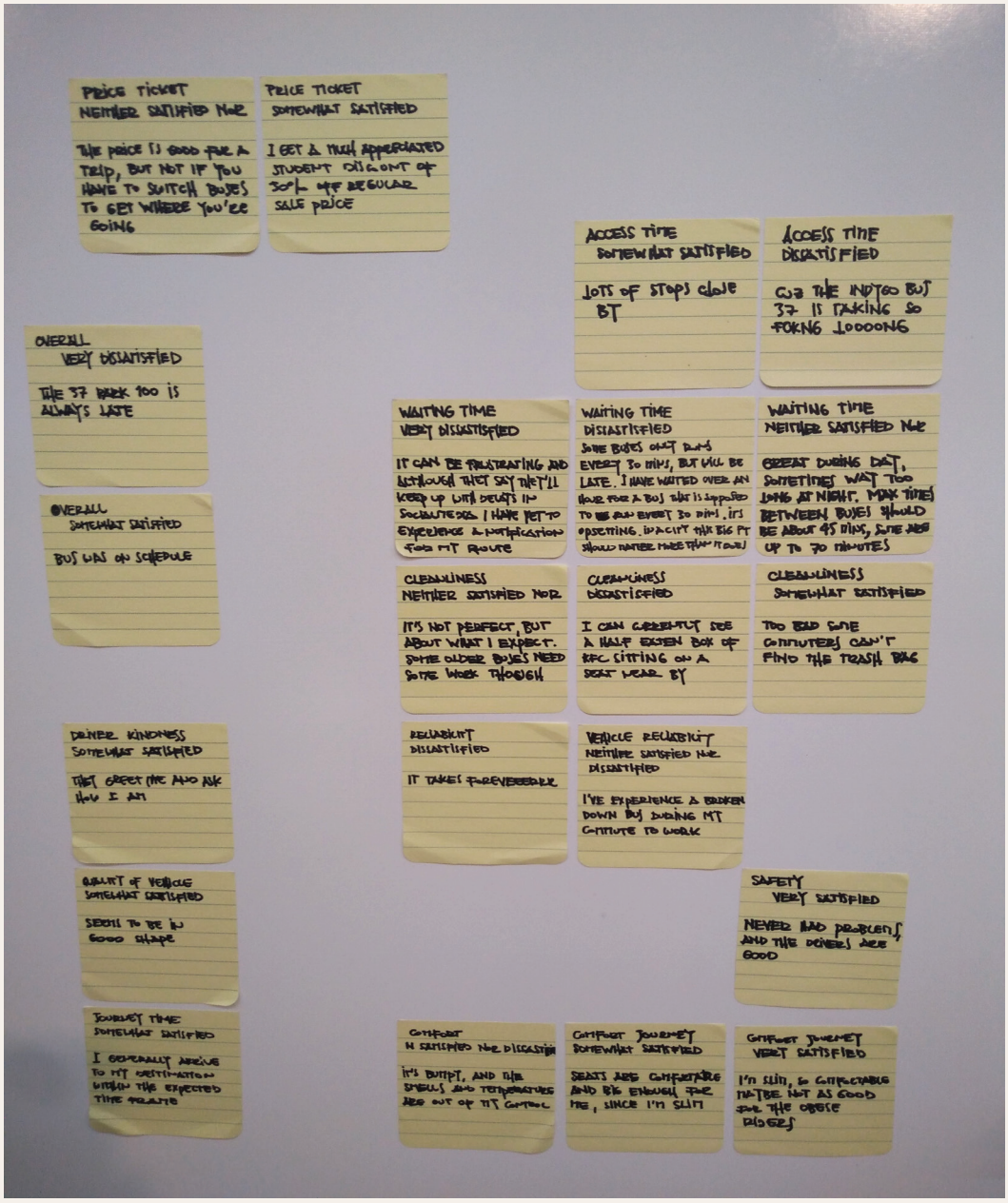


Galo Carrion
To: Galo Carrion
Public Transportation User Experiences (http://www.indymood.com/4/price_ticket.html)

-

How do you feel about?: Neither satisfied nor dissatisfied
Optional message: The price is good for a trip, but not if you have to switch buses to get where you\'re going

Downtown Indianapolis Map Data ©2016 Google



Data analysis and synthesis

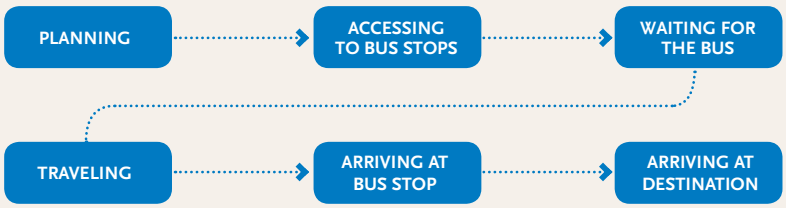
First, data was transcribed to post-its, using different colors to identify the source (interviews, tweets, or on-line surveys). Also, Twitter content was labeled with the date and associated hashtag.

The data analysis started by looking for recurrent themes, most of the data initially fitted into the service touchpoints, in the form of service assessments, complaints or reporting interactions problems within the system.

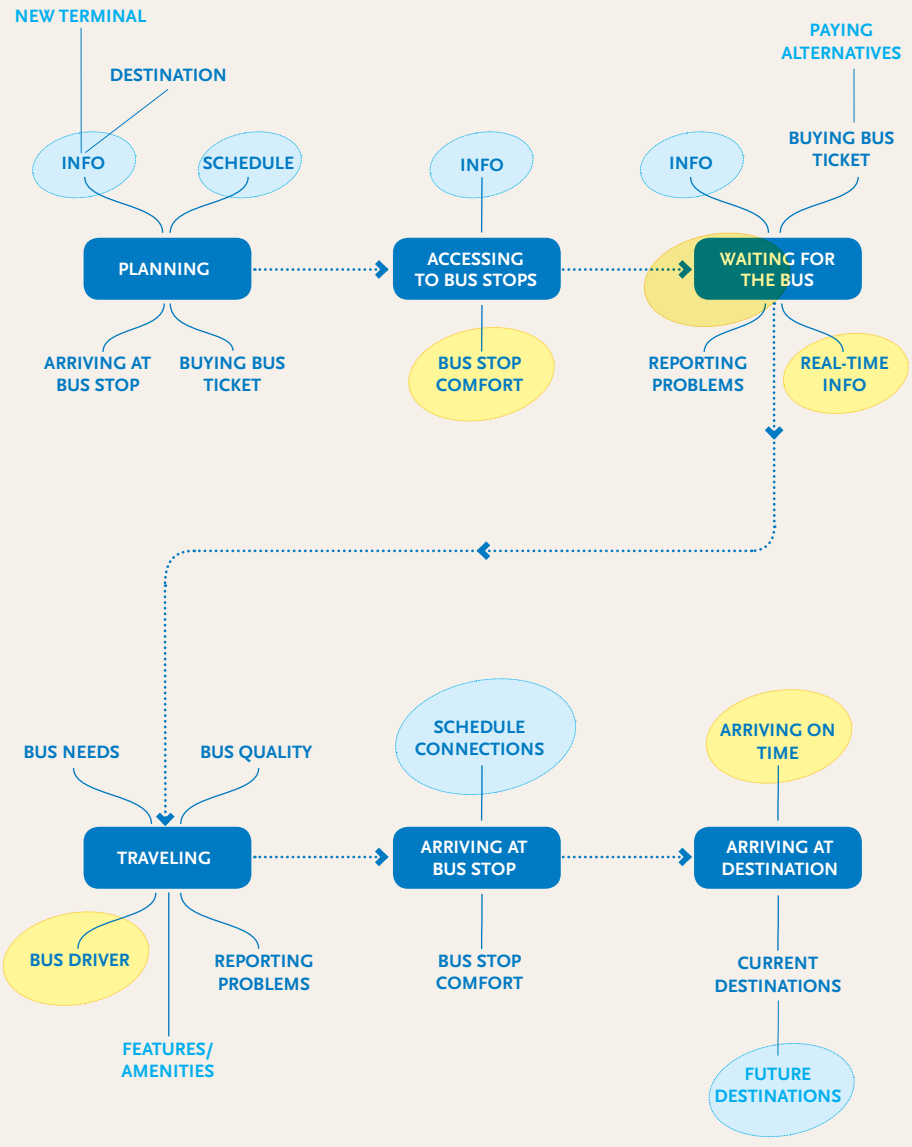
The groups created (affinity clustering) were labeled with the following tags: planning, accessing bus stops, waiting, bus drivers, bus comfort, bus stops, destinations, new terminal, bus needs, reporting problems, features, bus quality, info, schedule, arriving at destination, tracking/ real-time info, and overall evaluation.

Affinity clustering

Prioritizing



Judging & Forging connections

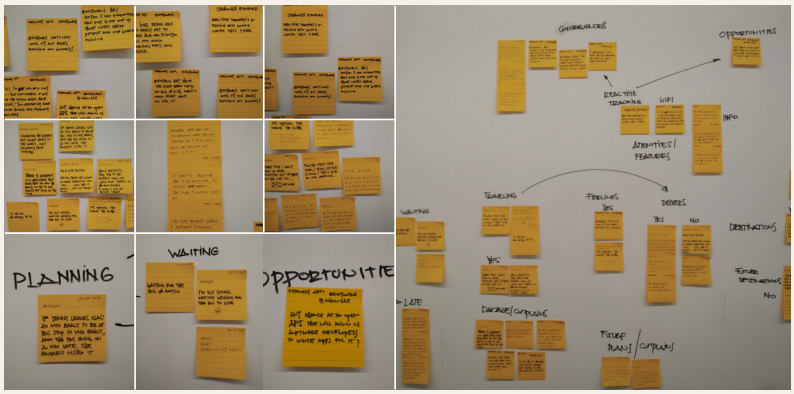


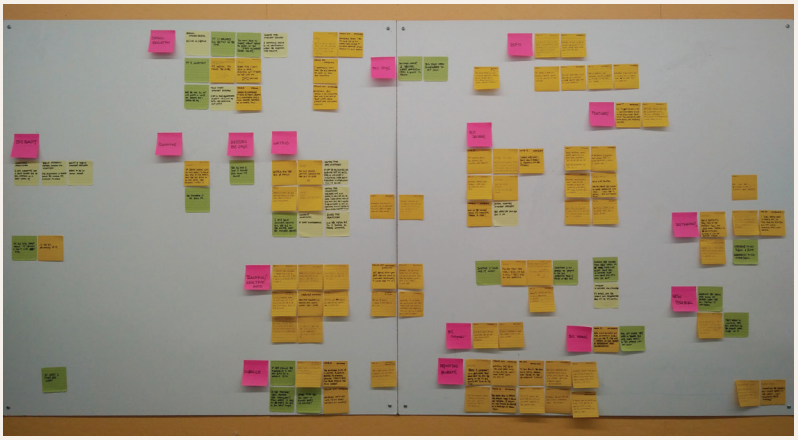
As mentioned before, some of these categories are directly related with the journey map touchpoints because is where/when task takes place; while other labels are subcategories or components of the touchpoints.

By prioritizing the data, the design researcher creates the structure to organize the data later, but also creates levels of hierarchy for a better understanding of the information.

The last stage revealed relationships between data, for example, the in-

formation component was present in almost each touchpoint, but also in different forms (schedule, real-time tracking information, updates about the services, plans). Late buses affect the perception of waiting time, but this perception can be amplified or diminished by other components (see pain points and opportunities map).





The last step before creating the experience map was to analyze the quantitative data. Although the result is not statistically significant because of the small number of responses, we can affirm, that users evaluated the public transportation system in two clusters, the first one (price of the bus ticket, access time to the bus stop, waiting time, journey time, and cleanliness of the vehicle) has primarily neutral evaluations with some negative. The second cluster (safety within the vehicle, comfort during the journey, driver's kindness, the comfort

INTERVIEWS QUANTITATIVE RESULTS

How do you feel about:	😩	😔	😒	😃	😍
price of the bus ticket?		●	●●	●	●
access time to the bus stop?				●●●	●●
waiting time?	●		●●	●	
journey time?			●●	●	
cleanliness of the vehicle?				●	
safety within the vehicle?		●	●●	●●	
comfort during the journey?			●	●●●	●
driver's kindness?			●●	●●	●
the comfort while starting and stopping your travel?		●●	●	●	●
reliability of the vehicle?		●		●●	
the quality of the vehicle?			●	●●	

ON-LINE SURVEY QUANTITATIVE RESULTS

How do you feel about:	😩	😔	😒	😃	😍
your overall travel experience?	●			●	
price of the bus ticket?			●	●	
access time to the bus stop?	●			●	
waiting time?	●●	●	●		
journey time?				●	
cleanliness of the vehicle?	●		●	●	
safety within the vehicle?					●
comfort during the journey?				●	●
driver's kindness?				●	
the comfort while starting and stopping your travel?			●		
reliability of the vehicle?			●		
the quality of the vehicle?				●	

while starting and stopping your travel, reliability of the vehicle, and the quality of the vehicle) have positive evaluations. In general terms, we can make an analogy and define these clusters as the software and hardware of the public transportation system. The software is related to the processes and interactions within the system while hardware is related to the space where the first one take place.

Following steps include developing personas to represent the different user groups found during the research, and to provide the lens through which the experience needs to be understood. Personas do not represent a specific individual but a group, and they are constructed of real stories. Personas, in this case, are rather a tool to put the audience of the experience map in the place of the users.

The experience map intends to show the sensemaking process, compiling in one visual tool the journey map, users' feelings and emotions, service assessment, researcher insights, and to identify pain points and opportunities.

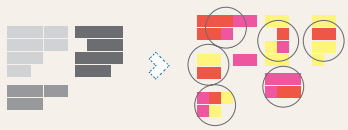
As part of this research, a detailed map explaining cause and effect of the main pain point and how the information component works within the service has been developed.

1

Data collection

Data was collected using interviews, Twitter posts, and on-line surveys. Interviews provided the user perspective for the following phases.

2



Data Analysis & Synthesis

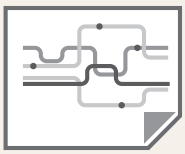
Data analysis & synthesis looked for patterns, relationships and recurrent themes.

3

Personas development

Several persona profiles were developed to represent the different groups encountered during the research.

4



Experience map development

Several persona profiles were developed to present the different groups encountered during the research.

Mary

21 years old
Full time student
From North Carolina

Motivation

Mary uses the public transportation because it is an affordable option, she is thankful that she can get a monthly pass ticket for half the regular price and save some money.

Her story

Mary is a university student; she can't afford a car, so she uses the public transportation to travel to between school and home. Mary is very responsible, and she plans ahead in almost every aspect of her life. For example, some weekdays she has to leave class 20 minutes earlier to get the bus, but sometimes the bus is late, and, because the lack of real-time information, she does not know how long she will need to wait.

Bruce

50 years old
Part time employee
Single without kids

Motivation

Bruce does not have a steady job; he just lost his last one, and now he is trying to get a full time position. Until that happens, he is trying to save money by using the bus.

His story

He lives alone in Beech Grove and works part time in downtown Indianapolis. To get to work, he takes two buses two or three times per week. Bruce is not an especially responsible person; sometimes he doesn't arrive at work on time because he woke up later than normal, but there is always someone else to blame. Sometimes, it is the fault of public transportation.

Keona

32 years old
Day care teacher
Married with four kids

Motivation

She lives only 15 minutes from downtown where she works. The closet bus stop is a just a 3 minute walk from her house where she can take 3 different bus routes.

Her story

Keona is happy with the public transportation service in Indianapolis; she uses it because her family owns just one car and even though they are planning to buy another, she maybe will keep using the public transportation because it is convenient and saves her time and money not having to find a place to park.

On the weekends the family use their car to get to the grocery store, the mall, and other places.

Experience Map
Indianapolis public transportation

PAIN POINTS
OPPORTUNITIES

Lack of realtime information & update

Users of public transportation think that information about detours, delays, route changes in drop offs, closed bus stops, etc. as a consequence of traffic jams, constructions, or other reasons can be improved.

In addition, updates about schedules or other changes in routes need to be communicated on time.

ACTIONS & ARTIFACTS

Finding the best option for travel
Looking for information
Accesing to information
Buying a bus ticket

Get to bus stop by walking

Bus stops affordances
Place to sit down
Protect against weather inclement

Waiting for bus
Getting protection from weather
Getting information

Getting informat

PLANNING & SHOPPING	WALKING TO BUS STOP	WAITING FOR THE BUS

INSIGHTS

Commuters feel OK about the regular schedule, the information delivered by timetables at bus stops, by brochures and as the result of online searches.
They think the ticket price is lower compared with other cities, and they also appreciate the different discounts offered.

Access by walking to bus stops is not a big issue for most commuters. Some commuters have more than one bus route from which to choose. On the other hand, reaching a bus stop is sometimes difficult because of the lack of sidewalks.

Late buses are among the main issues that directly affect waiting time. Other elements can also affect the level of comfort while waiting for the bus, such as the lack of protection in bus stops against inclement weather or lack of a place to sit down. At the same time, these other elements can also amplify or diminish feelings of the waiting experience.

Info · Schedule · Price

Distance by walking

Waiting time · Frequency · Comfort

FEELINGS

"The price is good for a trip, but not if you have to switch buses to get where you're going"

"I get a much appreciated student discount of 50% off regular sale price"

"The timetable is OK for me"

"The bus stop is just three minutes far from my home"

"It takes foreveeeeerrr"

"Bus was late, now I'm late again for work (...)"

"Cuz the Indygo bus 37 is taking so fckng looong"

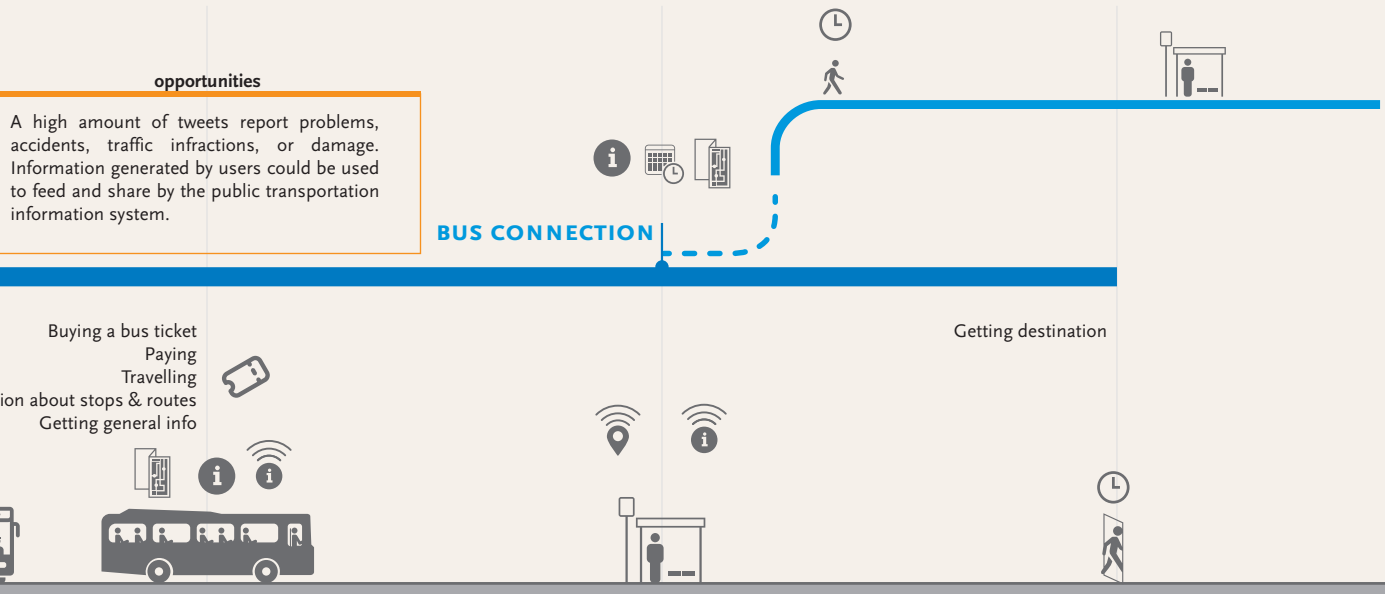
"Bus stops needs a shelter when is raining and a place to stand" / "Somewhere to sit down"

"If they improve the frequency I can get home at a decent time"

Overall evaluation | **Save money & time | Convenient**

opportunities

A high amount of tweets report problems, accidents, traffic infractions, or damage. Information generated by users could be used to feed and share by the public transportation information system.



TRAVELLING

Despite other factors to consider while travelling, such as travel time, cleanliness, safety, or vehicle reliability, the most important factor, according to commuters, is driver kindness. This can even affect the perception of other touchpoints within the travel experience.

Operator Kindness/ Driving skills

- "(...)bus is already running late and driver is taking a phone call"
- "Driver #8584 is rude. I asked her the destination of the bus was correct bc it was early, and a look of disgust was my answer"
- "Did you teach this woman to make everyone car sick... Wow she is awful... lets not forget rude"
- "One of the drivers saved my morning cheers to that!"
- "@IndyGoBus BO#6978 great person... great driver... you need more like him... IB31"

ARRIVING BUS STOP

Cleanliness
Safety
Comfort
Travel time
Vehicle reliability

- "For 10th street they need a bigger bus with more seats so people can sit down"
- "During the summer time they need to make suere buses have air. sometimes buses don't have air and will be hot"
- "I can currently see a halt eaten box of KFC sitting on a sit near by"
- "So glad my @IndyGoBus is warm when I started my day it was warm & sunny"
- "Sometimes I am afraid of poelple on the bus. Sometime was a fight on the bus"

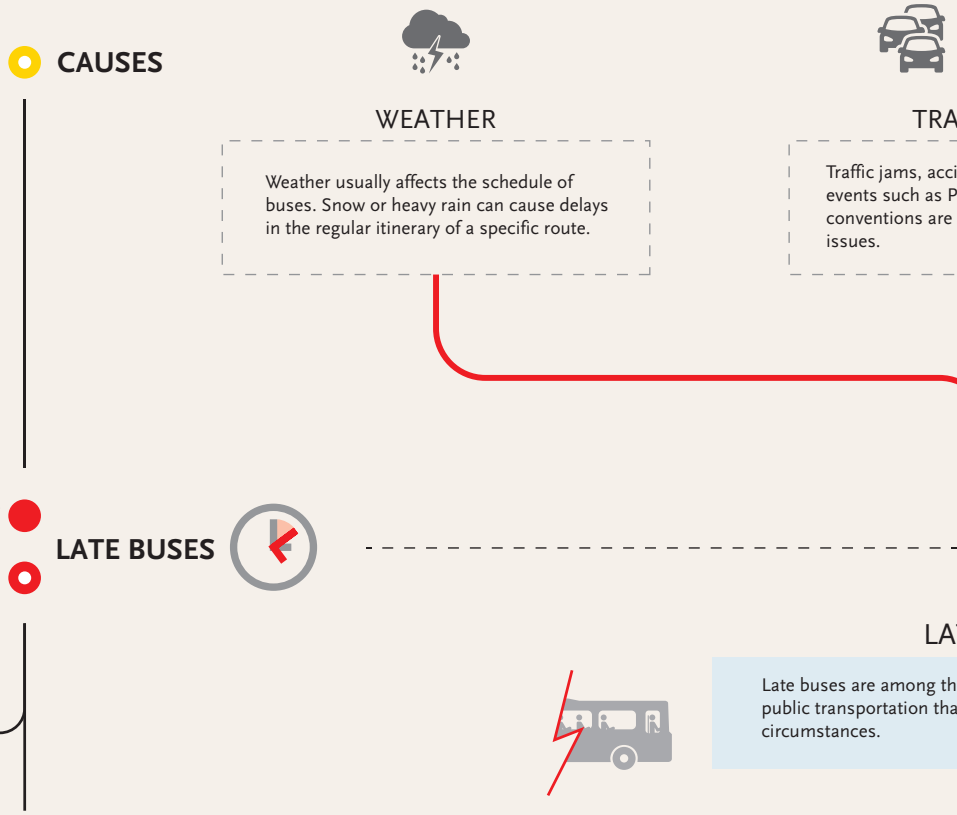
ARRIVING AT DESTINATION

For commuters, arriving at a destination on time is important, but also being able to travel to different parts of the city. With the actual coverage, they can not reach specific places in Indianapolis which affects the possibility of working or accessing health.

Coverage

- "If they improve the frequency I can get home at a decent time"
- "Huh. I can't take @IndyGoBus to get to @Butleru. That's surprising"
- "I love being able to easily get to Mass Ave via @IndyGoBus Bus and avoid parkings fee's and hassle"
- "Had a fantastic trip to the fashion mall and whole food thanks to @IndyGoBus I rode a lot of buses today"

Pain point The Waiting Perception



A late bus can affect the whole experience of using public transport but has also other effects such as being late to work or home, missing important meetings or connections with another bus route. Late buses are directly correlated with the perceived reliability of the public transportation system, and can define whether people use it or not.

N

FFIC ISSUES

dents, roads constructions, Pacers' games or big among the causes of traffic

BROKEN BUSES

According to participants, broken vehicles are not common issues, but are among the causes of late buses.

TE BUSES

e factors relating to the quality of t could be caused by different

TING TIME

delayed bus has a direct impact on the public transportation, but what is collected is that the "perceived waiting r diminished by other components of system such as **realtime information**, the **degree of protection at bus stops.**.

FACTORS THAT CAN AFFECT THE WAITING TIME EXPERIENCE

Frequency. Some routes usually change their frequency after 6 pm. from every 15 minutes to 30 minutes, that means that missing or waiting for a new bus take longer.

Degree of protection at bus stops. In Indianapolis, not all the bus stops have a shelter to protect commuters from inclement weather, this factor makes the waiting time worse during the winter or when it is raining.

The lack of **realtime info** is, according to the data collected, the main factor that affects the perception of waiting time because the uncertainty of the arrival of the next bus or the ability to make a connection.

Driver kindness. Drivers or bus operators behavior can affect the perception of waiting time, and define the quality of the experience of using public transport.

DRIVER KINDNESS/ DRIVING SKILLS

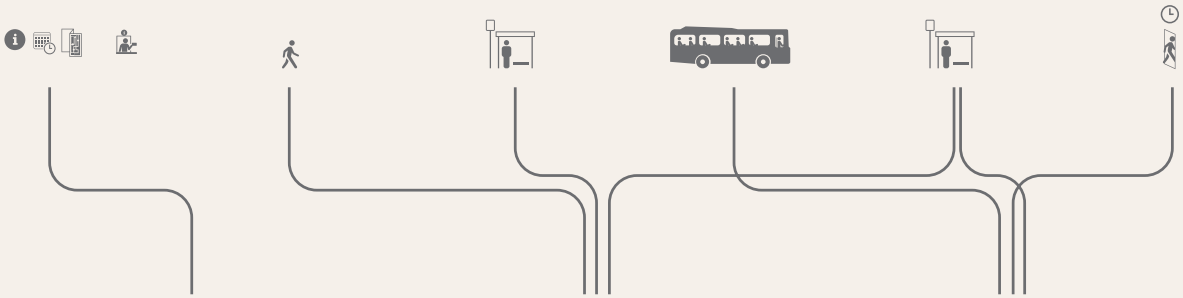
DEGREE OF PROTECTION AT BUS STOPS

REALTIME INFO

FREQUENCY

Experience Map / April, 2016 **/ Information Sources:** commuters interviews / Twitter posts / Online surveys

INFORMATION
ON INDIANAPOLIS PUBLIC TRANSPORTATION



Commuters feel OK about regular schedule information delivered as timetables at bus stops, information brochures and as the result of online searches.

SCHEDULE INFO

While waiting for the bus commuters do not have a source for realtime information/tracking this lack of info makes the waiting when the bus is late worse.

REALTIME INFO

Future information about detours, delays, changes in drop offs, closed bus stops, etc. as a consequence of traffic jams, construction, or other reasons.

ALERTS & UPDATES

INFORMATION

Still from *Mr. Robot*, Copyright 2015,
Universal Cable Productions

[e]veryone designs who devises courses of action aimed at changing existing situations into preferred ones.

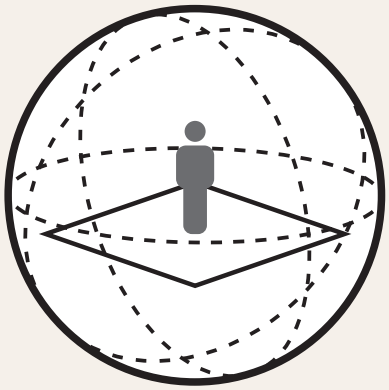
Herbert Simon

CHAPTER 3

A SENSEMAKING PROCEDURE TO UNDERSTAND EXPERIENCES IN SERVICE DESIGN

How to use this procedure

This procedure has been developed to understand the different user experiences in service design using the public transportation system in Indianapolis as the context to explore processes, methods, and tools. This is meant to be a recommendation about how to gather, analyze, and synthesize data, and how to use a sensemaking process to understand users' experiences. However, the entire procedure or some parts must be adapted to specific needs of other contexts.



The Context

Because of its nature, public transportation represents what in Design Research is known as a Wicked Problem (Buchanan, 1992), in which there are several stakeholders who may affect or be affected by a proposed solution.

From this experience, it is appropriate to use this set of methods in ill-defined problems where it is important to collect all the different stakeholders' voices but especially from service users. Also, it is well suited to understand the experiences from a qualitative and quantitative perspective because the methods for collecting data allow both approaches.

Considering that private and social services are ill-defined problems, they require an alternative approach because standardized approaches emphasize statistics and experiences in an abstract way, and if we consider the entire ecosystem service, its efficiency, usability or desirability can not be assessed by using these approaches. Services such as Public Transportation, Education or Health often require significant investment and do not always have a return on that investment that can be easily measured; the benefits usually can be assessed in the mid and long term, but not using money or numbers as the unit to evaluate them. Likewise, service design in the private sector does not differ a lot from public services, even when profits can be considered a primary goal: a good experience can also increase growth and brand loyalty, and help to differentiate brands.

Stakeholders and their roles in the sensemaking process

As we mentioned before, wicked problems have multiple stakeholders involved, and a people-centered approach required the participation of each of them in different research stages. Therefore, it is important to make clear their roles in the sensemaking process.

Users are the primary stakeholders or problem owners, and service design looks at them as the experts about the service. Data are collected from their experiences, and the analysis and synthesis are made from their point of view. Users can also be part of data analysis, and they can play a significant role in validating the outcomes. In this sense, it is important to clearly state that the results of this research do not pretend to be a conclusion, but rather a tool to help taking actions in the following steps.

Decision, policy makers or service providers, are the audience of the outcomes of sensemaking process but to understand them it is recommended that they take part of the sensemaking process data analysis and synthesis.

On the other hand, **researchers** play different roles designing the methods and tools to collect or synthesized data, leading the analysis, translated the insights in several outcomes, and facilitating the stakeholders participation.

Tools to collect data

The tools to collect data were developed to gather qualitative and quantitative information to have a better approach to understanding user experiences, taking advantage of the multiple affordances of smartphones described as “mobile ethnography” in This is service design.

1. Interviews

Due to the existence of a considerable amount of literature about interviews in design research, we decided to refer directly to the sources instead of duplicating information.

Some resources recommended about interviews:

- Innovating for People: Handbook of Human-Centered Design Methods.
- Convivial toolbox. Generative research for the for the front end of design.
- 101 design methods: A structured approach for driving innovation in your organization.
- This is service design thinking: basics-tools- cases.

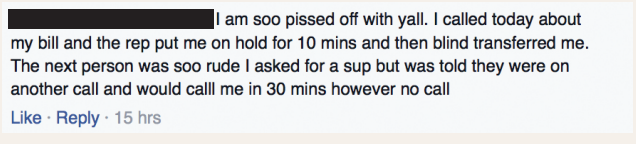
Possible issues

During this study, interviewees had problems using the app to assess their experiences as part of the interviews. Despite the value of also collecting quantitative data during this phase, to improve the interaction with participants it is recommended to use a more friendly and familiar tools such as printed sheets.

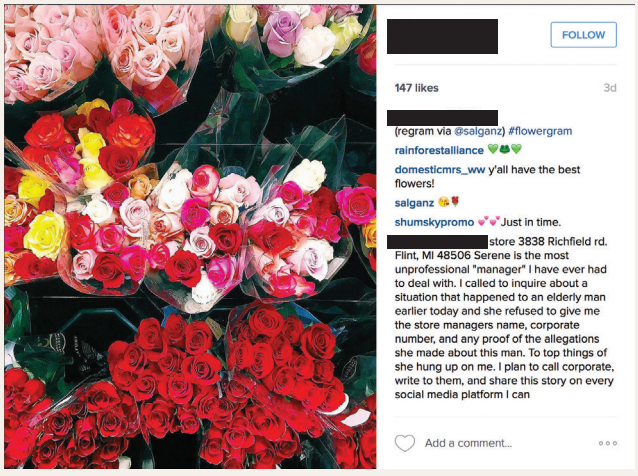
2. Twitter content analysis

Like all social media networks, the nature of Twitter posts is highly variable. In this study, content was found that was not related at all to the Twitter accounts primary theme like users advertising other products, posting links to news or promoting their own accounts. In this phase, only posts from people that reflect their feelings or assessments about public transportation services has been collected.

Depending on the service data can be retrieved from different social media networks. The more renowned are Facebook or Twitter where one can find a lot of textual content, but even Instagram where the content is mostly photographic is feasible for analysis, also non-orthographic communication or the use of emojis or emoticons represent an opportunity to collect sentiments about the service.



Post from a user complaining about the customer service of a mobile phone company, found out on Facebook



An Instagram user reporting an "unprofessional manager" at Kroger.

Possible issues

Since some content can be sensitive it is important to take measures to avoid exposure of identity issues.

3. Online surveys

Online surveys containing closed and open questions represent a significant opportunity to collect data. Internet networks, for example, in parks or public buildings or within shopping malls can be used to redirect respondents to the on-line survey page to conduct design research.

In this study, the small number of responses allowed analysis of them without using complex or expensive resources, but in the case of collecting larger amounts of data, it is recommended to compile the results in databases for later analysis or exporting the data so that other tools may be used to visualize it, helping to validate the qualitative insights made by researchers.

Possible issues

Since there is no way of controlling the answers to open questions, it is important to discriminate between relevant information and information which is not pertinent.

Making sense of the data

The data collected does not have an intrinsic value if there is not a process of sensemaking to convert data into meaningful information. (Sanders, 2012).

The sensemaking process, in this case, can be developed in several stages. The process looks for similarities, recurrent themes or related ideas, but more important "uncover[s] hidden meaning in the behavior that is observed (...)" (Kolko, 2012)

Despite this, sensemaking is not a linear process—because there are a lot of moving forward, and backward—identifying the service touchpoints is a good first approach to the data, then, researchers can look for patterns within the touchpoints, and recurrent themes across the service. The result is a first map of what is happening in the service.

A second step focuses on prioritizing the information, looking for relevant issues, which can be supported by the quantitative data collected.

Finally forging connections, as mentioned by Kolko, "actively produces knowledge" by combining existing, collected data and researcher insights.

Making sense is better developed by externalizing the process using post-its or other artifacts, that allow one to freely manipulate the data without committing to an idea, group or label. Externalizing the process takes "the data out of the cognitive realm, and makes it tangible in the physical realm in one cohesive visual structure (the wall)."(Kolko)

This process is also iterative; while developing the experience map, researchers can go back and modify groups, hierarchies, and relationships among the data.

Mapping the Experience

The goal of the mapmaking activity is to develop, through the sensemaking process, a deeper understanding of the users' motivations and feelings as the result of interacting with a service, to:

- Create an empathic view of users' experiences.
- Facilitate the action. A sensemaking map is not a finished outcome; it is an activity, a trigger to rethink a service from the user point of view and move forward.
- Redefine the POV to rethink the service. Focus on provider efforts and resources, and take advantage of opportunities.

The strategy includes developing personas, and journey map that locates the actions and artifacts at specific touchpoints as well as mapping feelings, insights and identifying pain points.

Developing Personas

Personas are tools created from gathered data to represent different groups of users. The goals of developing personas are to create an "image"—hypothetical archetypes" (Cooper, 2008)—of particular groups of users to engage, and to build empathy with stakeholders. Personas allow researchers and decision makers to look at the collected data from the user perspective, and rethink the service for them and their particular goals, tasks, and skill levels.

Recommendations to develop personas

Design personas are different from tools used in marketing such as customer or reader profiles, and some approaches are helpful to develop a compelling persona. Recommendations to develop personas include: using a name, an engaging image, demographics, and a narrative that tells a personal story.

- Visual representation techniques such as using photos or drawings to give users a "real" face that goes beyond the statistical data.

- Demographics are helpful to give personas credibility and maintain a certain research rigor, “the most accurate and convincing personas are based on actual field research.” (Ilama, 2005)
- Anecdotal profiles can build empathy with researchers, decision makers or stakeholders.

Experience map

The experience map is the result of putting together different service design tools such as a **1.** Journey map, **2.** The emotions resulting of interacting with the service **3.** Insights captured from design research, **4.** Service assessment, and finally, **5.** Opportunities and pain points identified

Recommendations to develop an experience map

Have in mind the audience, a clear hierarchy and also being definitional should make the map self-explanatory, even when we made clear that this tool is not a conclusion itself. Other components of the experience map include:

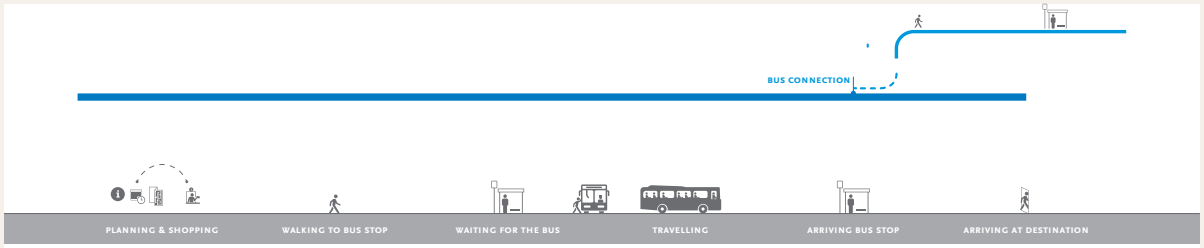
- To describe the feelings and emotions resulting from the interaction with the service,
- To capture the insights from data analysis,
- To identify the pain points and opportunities within the system.

Developing a journey map start by identifying the different touchpoints in the service **[A]**, in the case of PT most of these are places where users develop particular actions like “waiting for the bus”, in other services, tasks are completed in the same place, a website for example, in this case, touchpoints can be identified by the different micro tasks to reach a final goal. For example, when buying a flight ticket for example first you need to search for a flight, choose among the options, book seats, pay for the ticket, and receive an order confirmation; each one of this steps can be considered a touchpoint.

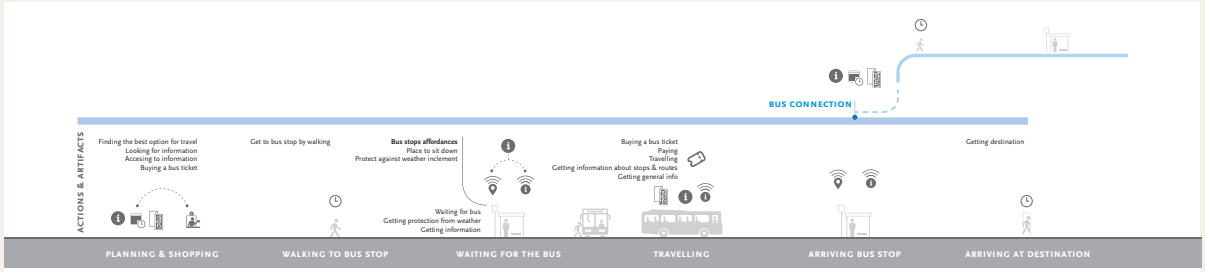
[A] To identify touchpoints

TOUCHPOINT 1 | TOUCHPOINT 2 | TOUCHPOINT 3T | TOUCHPOINT 4 | OUCHPOINT 5 | TOUCHPOINT 6

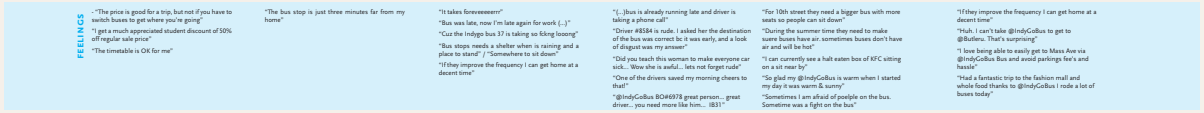
[B] Actions that take places over time and space



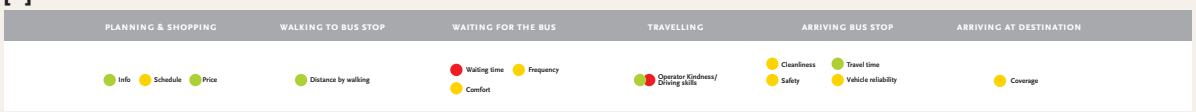
[C] Artifacts and interaction within touch point to reach mini tasks



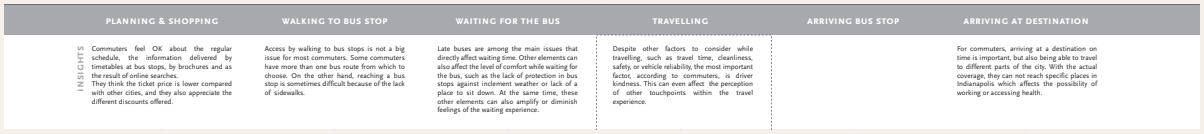
[D] Map feelings and emotions



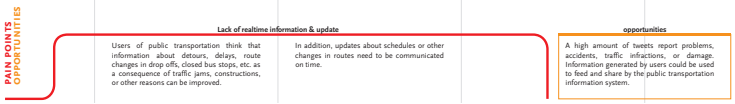
[E] Service assessment



[F] Insights



[G] Pain points and opportunities



Other journey map components are the actions and artifacts **[B]** used to reach those micro tasks. By knowing these items we can have a better idea about the complexity of the user interactions and to assess artifact efficiency and system usability.

Identifying the touchpoints works as a guide to build the journey map, the purpose of which is to illustrate how the service works. Service Design studies experiences as a result of the interaction of the users with people, places, and technology, and the goal of creating journey map is to visualize the interactions and identify artifacts used to achieve specific tasks within the several service touchpoints **[C]**. The journey maps is an important component to understanding the importance and value of a particular touchpoint for your customers.

Mapping **feelings and emotions [D]** show how the service is experienced.

Feelings and emotions give to the experience map audience a better understanding of the user perspective. By knowing the stories of how the service can affect the lives of users, service providers can understand how their decisions can improve their user's life quality.

Service assessment [E]

Collecting quantitative data helps to cross-validate the design research. The purpose of quantitative data in people-centered design research is not the same, despite the fact that the data is the same, the lens through which we look and analyze quantitative data differs, hence so do the conclusions or insights gained from them.

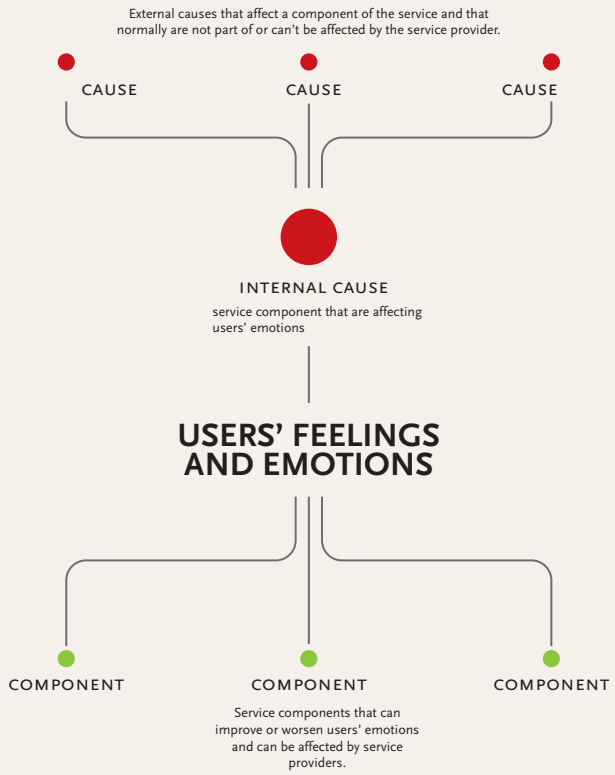
Capturing **insights [F]**, and **identifying pain points and opportunities [G]**, reveals what we learned about the service.

Based on the data analysis and synthesis, researchers can obtain relevant information about the service, identifying pain points and opportunities.

Pain points and Opportunities

We can identify pain points and opportunities in the experience map to relate and support our assumptions with the different components of the map and the data collected. A pain point like opportunities can be located in specific touchpoints, or linked to action or interactions within the service system.

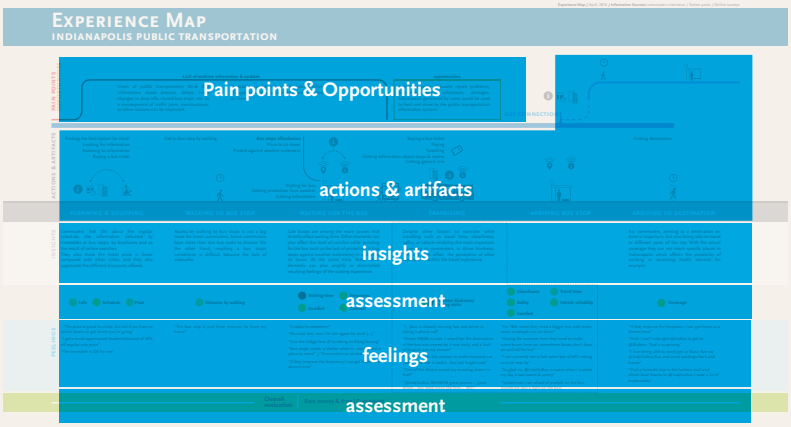
A more detailed mapping of causes and effects of both pain points and opportunities could reveal failures within the system and enable decision makers to focus their efforts on implementing solutions that have a greater impact on the service. For example, within the PT system in

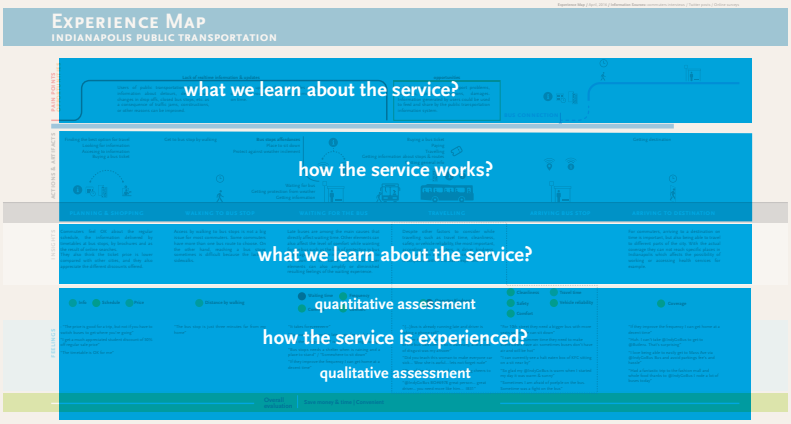


Indianapolis several causes for late buses have been identified that affect the waiting time, which is an issue for commuters. Late buses, in turn, are caused by weather, traffic issues, or broken buses; on the other hand, the time perception while waiting can be amplified due to frequency, the degree of protection at bus stops, lack of real-time information about bus location, or driver kindness.

Since we can not affect the weather, or eliminate traffic issues, mapping causes, and effects can help to tackle the waiting time problem in an innovative way and having a positive impact in the service—optimizing resources, implementing bus shelters, improving the frequency of buses or providing real-time information, for instance.

Finally, the experience map is the result of putting together all these components; as we mentioned before this tool is not at a conclusion but instead a trigger to facilitate actions. Also, an experience map is the result of a sensemaking process that is the key activity to understand user experiences, is about the things that we can learn about while we are mapping those experience across a service system.





To sum up, an experience map is the result of piecing together a Journey Map (How the service works?), Users feelings and emotions (How the service is experienced), Service assessment (How users evaluate the service?), Insights, pain point and opportunities (What we learned about the service?).

CHAPTER 4

CONCLUSIONS

(...)interface is "a place where human agency changes form

Sandy Stone

Although an important part of the data collected came from conducting methods without face-to-face interactions, the analysis and synthesis have been based and structured on the initial interviews and using such tools as personas. These set of data and tools have been crucial for a better understanding of additional sets of data and also for providing the user perspective for later analysis and synthesis. Without this user-centered approach, from our point of view, it is impossible to look through the data to get meaningful information other than confirmation of researcher assumptions or relevant information different from a quantitative approach. In the words of Whicher, Swiatek, and Cawood (2013), "the value of a service design approach is that it involves engaging the users directly in service development through action research, which provides a qualitative and human dimension to servicedevelopment leading to increased desirability, usability and efficiency".

Using this people-centered approach in service design is not just about collecting qualitative data from the users but also about having a new perspective to gather data, analyze, and synthesize it to get meaningful information about their experiences. We can venture to say that understanding the different user experiences using sensemaking processes is an activity—more than an outcome—to shift the provider perspective, about the service, based on real users needs. At first sight, public transportation, for example, is about moving persons from a place to another but if we try to understand real user's requirements and the implications of designing a "good" or "bad" PT system, we can switch our perspective to a new and more comprehensive way such as providing commuters with the best options (routes, frequencies, schedules) to get different places and take advantage of their resources (time and money).

We can use the health care context for delivering another example. Curing illnesses or diseases is the simpler way of seeing health services. But in the case of a children's hospital, treating kids is just a component of the service, and they are one of the user groups of the service too. But a detailed stakeholder map can reveal that parents are important users of the service because of the related family dynamics—when a kid is sick, it affects the whole family. For example, when a child is ill, at least one parent can not work, or, if there are other kids, someone else needs to take care of them. An appropriate service improves the kid's experiences but also cares for the needs of the whole family: facilitating siblings visits, making the hospital stay less traumatic, etc. Expanding the range of the users to the whole family allows understanding of these different interactions and enables a shift from the simpler to a more complex and appropriate way of seeing the service, and finally to focus the efforts and resources on the issues that can have a bigger impact.

It is important to highlight the quantitative nature of data generated by smartphones and their potential for use it in design research because the anonymity, portability, and immediateness of content produced. Also, smartphones can supply enriched data, helpful to cross-validate (Seeman, 2012) insights from the study.

Innovation in service design can be made by engaging participants in the development phase, where a sensemaking process activity for researchers and other stakeholders, such as policymakers, or providers can add value to it, and where understanding the user experience could provide the human dimension and shift the understanding of the service provided.

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